No. 200500325

# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

## Virginia Tech Intellectual Properties, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

*WHEAT, COMMON*

*'3706'*

*In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this twenty-ninth day of September, in the year two thousand and six.*

*Attest:*

*Commissioner*
*Plant Variety Protection Office*
*Agricultural Marketing Service*

*Secretary of Agriculture*

**REPRODUCE LOCALLY.** ***Include form number and date on all reproductions*** 03.019

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

# APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

*(Instructions and information collection burden statement on reverse)*

*The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.*

*Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).*

1. NAME OF OWNER
Virginia Tech Intellectual Properties, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
VA98W-706

3. VARIETY NAME
3706

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Virginia Tech Intellectual Properties, Inc.
1872 Pratt Dr., Suite 1625
Blacksburg, VA 24060

5. TELEPHONE *(include area code)*
540-951-9378

6. FAX *(include area code)*
540-951-5292

**FOR OFFICIAL USE ONLY**

**PVPO NUMBER**
20050325

**FILING DATE**
August 15, 2005

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION
Virginia

9. DATE OF INCORPORATION
June 20, 1985

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE (S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Carl A. Griffey
Crop and Soil Environmental Sciences
Virginia Tech
Blacksburg, VA 24061-0404

**FEES RECEIVED**

**FILING AND EXAMINATION FEES:**
$ 3652.00
DATE 8/15/2005

**CERTIFICATION FEE:**
$ 768.00
DATE 4/26/06

11. TELEPHONE *(Include area code)*
540-231-9789

12. FAX *(Include area code)*
540-231-3431

13. E-MAIL
Cgriffey@vt.edu

14. CROP KIND *(Common Name)*
Wheat, Common

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. ☐ X Exhibit A. Origin and Breeding History of the Variety
b. ☐ X Exhibit B. Statement of Distinctness
c. ☐ X Exhibit C. Objective Description of Variety
d. ☐ X Exhibit D. Additional Description of the Variety *(Optional)*
e. ☐ X Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☐ X Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☐ X Filing and Examination Fee ($3,652), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☐ X YES *(If "yes", answer items 20 and 21 below)* ☐ NO *(If "no," go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ X YES ☐ NO
IF YES, WHICH CLASSES? ☐ X FOUNDATION ☐ REGISTERED ☐ X CERTIFIED

21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☐ X NO
IF YES, SPECIFY THE NUMBER 1, 2, 3, *etc.* ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

*(If additional explanation is necessary, please use the space indicated on the reverse.)*

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☐ X YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☐ X NO
IF YES, GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

| SIGNATURE OF OWNER | | SIGNATURE OF OWNER | |
|---|---|---|---|
| Michael J. Martin | | | |
| NAME *(Please print or type)* | | NAME *(Please print or type)* | |
| Michael J. Martin | | | |
| CAPACITY OR TITLE | DATE | CAPACITY OR TITLE | DATE |
| Executive Vice President | 5/25/05 | | |

INSTRUCTIONS

20050325

**GENERAL:** To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,450 ($300 filing fee and $2,150 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $300 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**Plant Variety Protection Office**
**Telephone: (301) 504-5518**
**FAX: (301) 504-5291**
**Homepage: http://www.ams.usda.gov/science/pvp.htm**

**ITEM**

18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

21. *See Section 83 of the Act for the Contents and Term of Plant Variety Protection.*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date.*

**21. CONTINUED FROM FRONT** *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

**22. CONTINUED FROM FRONT** *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*
A limited amount of Certified seed of '3706' Wheat was sold in the U.S. A. for the first time in October 2004.

**23. CONTINUED FROM FRONT** *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

**NOTES:** It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089.



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## 18A. Exhibit A: Origin and Breeding History

### Genealogy and Breeding Method.

Wheat cultivar 3706, previously tested as VA98W-706, was derived from the cross of VA91-54-350//'FFR555W'/'GA-Gore'. Parentage of VA91-54-350 is IN71761A4-31-5-48 //VA71-54-147 (CItr 17449)/ 'McNair 1813'. Wheat line IN71761A4-31-5-48 was developed by Purdue University and has the pedigree 'Benhur' (CItr 14054)/3/'Arthur' (CItr 14425)/'Knox' (CItr12798) type line/4/'Beau' (CItr17420)*2 /3/Arthur*2//'Riley' (CItr13702)/ 'Bulgaria 88' (PI 94407). The Knox type line has gene *H5* for Hessian fly [*Mayetiola destructor* (Say)] resistance. The cross from which 3706 originated was completed in spring 1992, and the $F_1$ generation was grown in the field at Warsaw, VA as a single 4ft headrow in 1993 to produce $F_2$ seed. The population was advanced from the $F_2$ to $F_4$ generation using a modified bulk breeding method.

### Population Advancement and Selection of the Variety.

Wheat spikes were selected from the population in each segregating generation ($F_2$-$F_3$) on the basis of absence of obvious disease, early maturity, short straw and desirable head shape and size. Selected spikes were threshed in bulk, and the seed was planted in 225ft$^2$ blocks in the fall of each year at Blacksburg and Warsaw, VA. Spikes selected from the $F_4$ bulk where threshed individually and planted in separate 4ft headrows at Warsaw, VA. Wheat cultivar 3706 was derived as a bulk of one of these $F_{4:5}$ headrows selected in 1997, and was evaluated as VA98W-706 in non-replicated observation yield tests in 1998 as entry 706. It was evaluated as VA98W-706 in replicated preliminary yield tests in 1999 (Table 12) and in advanced yield tests in 2000 (Table 11). Wheat cultivar 3706 was tested as VA98W-706 in 2001 and 2002 under conventional (Tables 1-3) and no-tillage (Tables 4-6) management systems in the Virginia Official Variety Trial. It also was evaluated throughout the eastern soft red winter wheat region in the USDA-ARS Uniform Eastern Soft Red Winter Wheat Nurseries in 2002 (Table 8).

### Multiplication and Purification.

Breeder seed of 3706 was derived as a bulk of 138 $F_{8:9}$ individual headrows selected among 280 total rows evaluated for homogeneity and trueness of type in an isolation block at Warsaw, VA in 2001. During fall 2001, approximately 110 lbs of the 3706 Breeder seed was planted on 1 acre at the Virginia Foundation Seed Farm at Mt. Holly, VA and produced 78 bushels of Foundation Seed. During fall 2002, 30 acres of 3706 were planted and produced approximately 2000 bushels of Foundation seed that was available to seedsmen in fall 2003. While 3706 has remained stable and uniform in composition through the last three generations of self pollination, variants observed within the variety include up to 1% plants that are 6-8 inches taller in height, 0.5% plants with awned spikes that are similar in height to 6 inches taller, 0.1% plants having crooked or nodding spikes, and 0.01% plants having yellow green foliage and spike color.

# '3706' Wheat

## 18B. Exhibit B: Novelty Statement

Wheat cultivar 3706 is uniquely different from all known wheat cultivars. It is most similar to its parent 'FFR 555W'. Wheat cultivar 3706 is resistant to powdery mildew (*Blumeria graminis*), while FFR555W is susceptible (See Table below). FFR555W possesses the gene *Lr*10 governing resistance to leaf rust (*Puccinia triticina*) and seedlings of FFR555W are resistant to leaf rust race TLGG (Virulence for genes *Lr* 1, 2a, 2c, 3, 9, 11, 18) while seedlings of 3706 are susceptible to race TLGG. While the identity of *Lr* resistance genes of 3706 is not known, it consistently has expressed higher levels of resistance to leaf rust than FFR555W in field tests (See table below). Head emergence of 3706 is consistently earlier (2-4 days) than FFR555W. Test weight of 3706 also is consistently higher than that of FFR555W.

## Comparison of 3706 with Parent FFR555W in 1999 – 2001 Virginia Replicated Variety Yield Trials

| Variety | Grain Yield | Test Weight | Date Headed | Plant Height | | Powdery Mildew | Leaf Rust |
|---|---|---|---|---|---|---|---|
| | Bu/Ac | Lb/Bu | Julian | Inches | 0.2 - 10 | 0-9 | 0-9 |
| 1999 | N=4 | N=4 | N=2 | N=2 | N=3 | N=2 | N=3 |
| 3706 | 86 | 60.1 | 124 | 33 | 0.3 | 0 | 1 |
| FFR555W | 72 | 58.3 | 128 | 35 | 0.4 | 6 | 4 |
| L.s.d 0.05 | 5.8 | 0.5 | 1 | 1 | 0.6 | 1 | 1 |
| | | | | | | | |
| 2000 | N=4 | N=4 | N=2 | N=2 | N=2 | N=2 | N=3 |
| 3706 | 90 | 58.2 | 120 | 34 | 1.0 | 1 | 2 |
| FFR555W | 70 | 55.5 | 124 | 35 | 0.2 | 6 | 7 |
| L.s.d 0.05 | 7.3 | 0.9 | 3 | 1 | 0.9 | 2 | 1 |
| | | | | | | | |
| 2001 | N=7 | N=7 | N=4 | N=3 | N=5 | N=4 | N=1 |
| 3706 | 81 | 58.5 | 123 | 29 | 2.0 | 2 | 0 |
| FFR555W | 76 | 56.2 | 125 | 32 | 1.3 | 6 | 4 |
| L.s.d 0.05 | 4 | 1.2 | 1 | 2 | 1.1 | 1 | 1 |

**REPRODUCE LOCALLY. Include form number and date on all reproductions.** Form Approved - OMB No. 0581-0055



**U.S. DEPARTMENT OF AGRICULTURE**
**AGRICULTURAL MARKETING SERVICE**
**SCIENCE AND TECHNOLOGY**
**PLANT VARIETY PROTECTION OFFICE**
**BELTSVILLE, MD 20705**

# OBJECTIVE DESCRIPTION OF VARIETY
## WHEAT (*Triticum* spp.)

**NAME OF APPLICANT(S)**
Virginia Tech Intellectual Properties, Inc.

**ADDRESS** *(Street and No. or RD No., City, State, and Zip Code)*
Virginia Tech Intellectual Properties, Inc.
I872 Pratt Dr., Ste. 1625
Blacksburg, VA 24060

**FOR OFFICIAL USE ONLY**

**PVPO NUMBER** 200500325

**VARIETY NAME** 3706

**TEMPORARY OR EXPERIMENTAL DESIGNATION** VA98W-706

**PLEASE READ ALL INSTRUCTIONS CAREFULLY:** Place the appropriate number that describes the varietal character of this variety in the boxes below. Place a zero in the first box (e.g. [0][9] or [0][9]) when number is either 99 or less or 9 or less respectively. Data for quantitative plant characters should be based on a minimum of 100 plants. Comparative data should be determined from varieties entered in the same trial. Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:_____ Please answer all questions for your variety; lack of response may delay progress of your application.

**1. KIND:**

[1]
1=Common
2=Durum
3=Club
4=Other (SPECIFY) : _____

**2. VERNALIZATION:**

[2]
1=Spring
2=Winter
3=Other (SPECIFY) : _____

**3. COLEOPTILE ANTHOCYANIN:**

[2] 1 = Absent 2 = Present

**4. JUVENILE PLANT GROWTH:**

[1] 1 = Prostrate 2 = Semi-erect 3 = Erect

**5. PLANT COLOR (boot stage):**

[3]
1 = Yellow-Green
2 = Green
3 = Blue-Green

**6. FLAG LEAF (boot stage):**

[1] 1 = Erect
2 = Recurved

[1] 1 = Not Twisted
2 = Twisted

[1] 1 = Wax Absent
2 = Wax Present

**7. EAR EMERGENCE:**

[1][2][0] **Number of Days (Average)**

[0][0] **Number of Days Earlier Than** _____ *

**Same as** McCormick *

[0][2] **Number of Days Later Than** 38158 *

* **Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial**

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**8. ANTHER COLOR:**

[1] 1 = Yellow
2 = Purple

**9. PLANT HEIGHT (from soil to top of head, excluding awns):**

[ 8 4] cm (Average)

[0 0] cm Taller Than _____ *

Same as McCormick *

[0 8] cm Shorter Than 38158 *

**10. STEM:**

**A. ANTHOCYANIN**

[1] 1= Absent
2 = Present

**B. WAXY BLOOM**

[1] 1 = Absent
2 = Present

**C. HAIRINESS**
(last internode of rachis)

[1] 1 = Absent
2 = Present

**D. INTERNODE**

[1] 1 = Hollow 2 = Semi-solid 3 = Solid

[5] Number of Nodes

**E. PEDUNCLE**

[3] 1 = Erect 2 = Recurved 3 = Semi-erect

[3 2] cm Length

**F. AURICLE**

[1] Anthocyanin 1 = Absent 2 = Present

[2] Hair Few 1 = Absent 2 = Present

**11. HEAD (at Maturity):**

**A. DENSITY**

[2] 1 = Lax
2 = Middense (Laxidense)
3 = Dense

**B. SHAPE**

[1] 1 = Tapering
2 = Strap
3 = Clavate
4 = Other (SPECIFY): _____

**C. CURVATURE**

[2] 1 = Erect
2 = Inclined
3 = Recurved

**D. AWNEDNESS**

[3] 1 = Awnless
2 = Apically Awnletted
3 = Awnletted
4 = Awned



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## 12. GLUMES (at Maturity):

### A. COLOR

[2]
1 = White
2 = Tan
3 = Other (SPECIFY) : _____

### B. SHOULDER

[4]
1 = Wanting 2 = Oblique
3 = Rounded 4 = Square
5 = Elevated 6 = Apiculate
7 = Other (SPECIFY):_____

### C. SHOULDER WIDTH

[2]
1 = Narrow
2 = Medium
3 = Wide

### D. BEAK

[2]
1 = Obtuse
2 = Acute
3 = Acuminate

### E. BEAK WIDTH

[2]
1 = Narrow
2 = Medium
3 = Wide

### F. GLUME LENGTH

[2]
1 = Short (ca. 7mm)
2 = Medium (ca. 8mm)
3 = Long (ca. 9mm)

### G. WIDTH

[2]
1 = Narrow (ca. 3mm)
2 = Medium (ca. 3.5mm)
3 = Wide (ca. 4mm)

## 13. SEED

### A. SHAPE

[1]
1 = Ovate
2 = Oval
3 = Elliptical

### B. CHEEK

[1]
1 = Rounded
2 = Angular

### C. BRUSH

[2]
1 = Short
2 = Medium
3 = Long

[1]
1 = Not Collared
2 = Collared

### D. CREASE

[1]
1 = Width 60% or less of Kernel
2 = Width 80% or less of Kernel
3 = Width Nearly as Wide as Kernel

[2]
1 = Depth 20% or less of Kernel
2 = Depth 35% or less of Kernel
3 = Depth 50% or less of Kernel

### E. COLOR

[3]
1 = White
2 = Amber
3 = Red
4 = Other (SPECIFY): _____

### F. TEXTURE

[2]
1 = Hard
2 = Soft
3 = Other (SPECIFY): _____

### G. PHENOL REACTION (*see instructions*):

[4]
1 = Ivory
2 = Fawn
3 = Light Brown
4 = Dark Brown
5 = Black

### H. SEED WEIGHT

[2][9] g/1000 seed (Whole number only)

### I. GERM SIZE

[2]
1 = Small
2 = Midsize
3 = Large

**14. Disease :** (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

**PLEASE INDICATE THE SPECIFIC RACE OR STRAIN TESTED** 200500325

| | | | |
|---|---|---|---|
| [2] | **Stem Rust** *(Puccinia graminis* **f. sp.** *tritici)* Races: RTQQ and TPMK | [1] | **Leaf Rust** *(Puccinia recondita* **f. sp.** *tritici)* Races: MCRK, TLGG, TFPB, TNRJ |
| [3] | **Stripe Rust** *(Puccinia striiformis)* | [0] | **Loose Smut** *(Ustilago tritici)* |
| [3] | **Tan Spot** *(Pyrenophora tritici-repentis)* | [0] | **Flag Smut** *(Urocystis agropyri)* |
| [0] | **Halo Spot** *(Selenophoma donacis)* | [0] | **Common Bunt** *(Tilletia tritici* **or** *T. laevis)* |
| [3] | ***Septoria nodorum*** **(Glume Blotch)** | [0] | **Dwarf Bunt** *(Tilletia controversa)* |
| [0] | ***Septoria avenae*** **(Speckled Leaf Disease)** | [0] | **Karnal Bunt** *(Tilletia indica)* |
| [3] | ***Septoria tritici*** **(Speckled Leaf Blotch)** | [2] | **Powdery Mildew** *(Erysiphe graminis* **f. sp.** *tritici)* |
| [1] | **Scab (*Fusarium* spp.)** | [0] | **"Snow Molds"** |
| [0] | **"Black Point" (Kernel Smudge)** | [0] | **Common Root Rot** *(Fusarium, Cochliobolus* **and** *Bipolaris* **spp.)** |
| [3] | **Barley Yellow Dwarf Virus (BYDV)** | [3] | **Rhizoctonia Root Rot** *(Rhizoctonia solani)* |
| [3] | **Soilborne Mosaic Virus (SBMV)** | [0] | **Black Chaff** *(Xanthomonas campestris* **pv.** *translucens)* |
| [2] | **Wheat Yellow (Spindle Streak) Mosaic Virus** | [0] | **Bacterial Leaf Blight** *(Pseudomonas syringae* **pv.** *syringae)* |
| [0] | **Wheat Streak Mosaic Virus (WSMV)** | [ ] | **Other (SPECIFY)** _____ |
| [ ] | **Other (SPECIFY)** _____ | [ ] | **Other (SPECIFY)** _____ |
| [ ] | **Other (SPECIFY)** _____ | [ ] | **Other (SPECIFY)** _____ |
| [ ] | **Other (SPECIFY)** _____ | [ ] | **Other (SPECIFY)** _____ |

**15. INSECT:** (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

**PLEASE SPECIFY BIOTYPE (where needed)**

| | | | |
|---|---|---|---|
| [1] | **Hessian Fly** *(Mayetiola destructor)* Biotypes: B,C,D,E,L | [ ] | **Other (SPECIFY)** _____ |
| [0] | **Stem Sawfly** *(Cephus* **spp.)** | [ ] | **Other (SPECIFY)** _____ |
| [1] | **Cereal Leaf Beetle** *(Oulema melanopa)* | [ ] | **Other (SPECIFY)** _____ |
| [0] | **Russian Aphid** *(Diuraphis noxia)* | [ ] | **Other (SPECIFY)** _____ |

15. INSECT: *Continued* (0=Not Tested; 1=Susceptible; 2=Resistant; 3=Intermediate; 4=Tolerant)

PLEASE SPECIFY BIOTYPE (where needed)

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| | | | |
|---|---|---|---|
| 0 | Greenbug *(Schizaphis graminum)* | | Other (SPECIFY) _____ |
| 1 | Aphids | | Other (SPECIFY) _____ |

16. ADDITIONAL INFORMATION ON ANY ITEM ABOVE, OR GENERAL COMMENTS

# WHEAT DESCRIPTOR ILLUSTRATIONS

Section numbers correspond to the numbers of the sections on the form.

20500325

## 4 EARLY PLANT GROWTH HABIT:

1 Prostrate | 2 Intermediate | 3 Erect

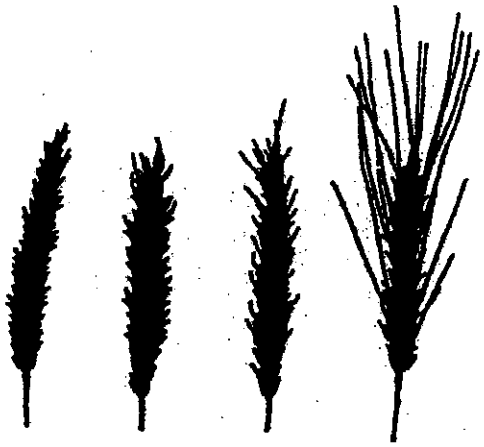
## 10 STEM INTERNODE X-SECTION

1 Hollow | 2 Semi-Solid | 3 Solid

## 11 SPIKE SHAPE

1 Tapering | 2 Oblong | 3 Clavate | 4 Elliptical

## 11 AWNEDNESS:



1 Awnless | 2 Apically Awnleted | 3 Awnleted | 4 Awned

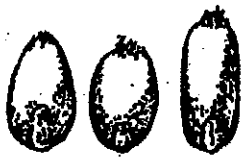
## 12 BEAK SHAPE:

1 Obtuse | 2 Acute | 3 Acuminate

## 12 SHOULDER SHAPE:

1 Wanting | 2 Oblique | 3 Rounded | 4 Square | 5 Elevated | 6 Apiculate

## 13 SEED SHAPE:

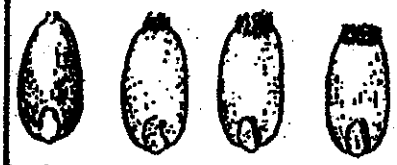


1 Ovate | 2 Oval | 3 Elliptical

## 13 CHEEK SHAPE:

1 Rounded | 2 Angular

## 13 BRUSH SIZE:



1 Small | 2 Midsized | 3 Large | Collared

## 13 BRUSH HAIR LENGTH

1 Short | 2 Medium | 3 Long

## GERM (EMBRYO) SIZE:

1 Small | 2 Midsized | 3 Large

## 13 SEED CREASE WIDTH:

1 Narrow | 2 Mid-Wide | 3 Wide

## 13 SEED CREASE DEPTH:

1 Shallow | 2 Mid-Deep | 3 Deep

**REFERENCE**

**Briggle, L.W. and L.P. Reitz. 1963. Classification of Triticum Species and of Wheat Varieties Grown in the United States. Technical Bulletin 1278. United States Department of Agriculture.**

## 18D. Exhibit D: Additional Description of '3706' Wheat.

Performance of 3706 (VA98W-706 in Tables) in comparison with other soft red winter wheat cultivars is presented in Tables 1-6 and 8. VA98W-706 is a high yielding, moderately early heading, short-stature, awnleted, soft red winter wheat with high test weight and good straw strength. Head emergence is 1 to 2 days later than 'Sisson' and 2 to 3 days earlier than 'Roane'. Average plant height of 3706 (31 inches) is similar to that of Sisson and 1 to 2 inches shorter than Roane. Straw strength (0.2=No lodging, 10=Completely lodged) of 3706 is good (range of 0.2 to 2.0 and mean of 1.2) and is better than that of Sisson (range of 1.5 to 4.3 and mean of 2.9). In Virginia's Official Variety Trials, average grain yields of 3706 in 2001 (81 bu/ac) and 2002 (85 bu/ac) under conventional tillage were significantly ($P \leq 0.05$) higher than the test average (Tables 1-3). In no-till trials following maize conducted at Warsaw, Virginia, 3706 produced grain yields (89 bu/ac) similar to the test average in 2001, while grain yields of 3706 (91 bu/ac) were significantly higher than average in 2002 (Tables 4-6). Grain volume weight of 3706 (59.0 lb/bu) is high; it is 0.5 lb/bu lower than that of Roane and 1 lb/bu higher than that of Sisson.

Wheat cultivar 3706 was evaluated as VA98W-706 in the 2002 USDA-ARS Uniform Eastern Soft Red Winter Wheat Nursery (Tables 8), and ranked 5$^{th}$ among 44 entries in the region for grain yield (78 bu/ac), while the check variety Roane ranked 16$^{th}$. In the same trials, wheat cultivar 3706 ranked 5$^{th}$ for grain volume weight (58.8 lb/bu). Based on data from four test sites in the Uniform Eastern SRW Wheat Nurseries, winter-survival of 3706 is good and similar to that of 'Caldwell' and 'Tribute'.

Reaction of 3706 (VA98W-706) to disease and insect pests has been evaluated in Virginia (Tables 1-6) and over the eastern region (Table 8). Wheat cultivar 3706 is resistant to powdery mildew (*Blumeria graminis*), and consistently had low scores (0-2 on a 0=Resistant to 9=Susceptible scale) in five states across the eastern region and Ontario, Canada. In seedling tests conducted at the USDA-ARS Cereal Disease Laboratory in St. Paul, MN, 3706 expressed resistance to 7 of 9 races of leaf rust (*Puccinia triticina*) and was resistant to 4 of 6 races of stem rust (*Puccinia graminis*). In field tests conducted over the eastern region, 3706 had leaf rust scores (0=Resistant to 9=Susceptible) ranging from 0 to 4 with an average score of 1.4 (Table 8). In tests conducted in Arkansas and Washington, 3706 expressed resistance to stripe rust (*Puccinia striiformis*). It has expressed high levels of resistance to soil borne mosaic virus and wheat spindle streak mosaic virus. Wheat cultivar 3706 is moderately resistant to leaf blotch (*Septoria tritici*), glume blotch (*Stagonospora nodorum*), and barley yellow dwarf virus. It is moderately susceptible to fusarium head blight (*Fusarium graminearum*). On the basis of seedling tests conduct by USDA-ARS at West Lafayette, IN, 3706 is susceptible to Hessian Fly [*Mayetiola destructor* (Say)] biotypes B, C, D, E, and L.

Milling and baking quality of 3706 (VA98W-706) is good and superior to that of Roane, Pioneer Brand '2580', 'Coker 9663', and 'USG 3209' (Tables 13-19). In comparisons with these four cultivars, 3706 yields more flour that is lower in water absorption and producers cookies of larger diameter. Flour protein concentration of 3706 (9.22%) is higher than that of FFR 555W (8.38%). On the basis of lactic acid retention capacity, flour of 3706 has stronger gluten strength (115%) than that of FFR 555W (102%). Therefore flour of 3706 likely will serve dual purposes in production of traditional pastry products as well as crackers.

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**Table 1. Two-year summary of performance of VA97W-24 and VA98W-706 in the Virginia Tech Wheat Test, 2001 and 2002 harvests.***

| Line | Yield (Bu/acre) | | Test Weight (Lb/bu) | | Date Headed (Mar 31+) | | Height (In) | | Lodging♥ (0.2-10) | | Powdery Mildew (0-9) | | Leaf Rust (0-9) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (13) | | (13) | | (8) | | (6) | | (8) | | (7) | | (3) | |
| **VA97W-24(RT)** | 84 | | 58.0 | - | 31 | + | 35 | + | 2.5 | | 1 | - | 1 | |
| **VA98W-706(RT)** | 81 | | 58.6 | | 29 | - | 31 | - | 1.3 | - | 2 | | 0 | - |
| TRIBUTE(RT) | 87 | + | 60.3 | + | 29 | - | 31 | - | 2.0 | | 0 | - | 0 | - |
| McCORMICK(RT) | 85 | + | 59.8 | + | 30 | | 31 | - | 1.8 | - | 0 | - | 0 | - |
| SS550 | 84 | | 57.5 | - | 29 | - | 32 | | 2.8 | | 2 | | 2 | + |
| SISSON (RT) | 84 | | 57.8 | - | 27 | - | 31 | - | 3.2 | | 2 | | 3 | + |
| SS520 | 84 | | 57.2 | - | 27 | - | 35 | + | 2.8 | | 2 | | 3 | + |
| USG 3209(RT) | 82 | | 57.3 | - | 28 | - | 30 | - | 2.8 | | 2 | | 3 | + |
| PIONEER 26R24(B) | 82 | | 57.9 | - | 28 | - | 34 | + | 2.4 | | 2 | | 3 | + |
| CENTURY II(D) | 77 | - | 58.1 | | 29 | - | 33 | + | 3.0 | | 4 | + | 1 | |
| AGS2000 | 75 | - | 58.0 | - | 27 | - | 32 | | 4.0 | + | 2 | | 0 | - |
| FFR 518(RT) | 74 | - | 56.8 | - | 27 | - | 31 | - | 5.3 | + | 1 | - | 0 | - |
| PIONEER 26R38(B) | 73 | - | 57.3 | - | 28 | - | 35 | + | 3.0 | | 2 | | 2 | + |
| PIONEER 26R61(B) | 69 | - | 59.2 | + | 29 | - | 34 | + | 1.8 | - | 3 | + | 0 | - |
| Test Average (n=14) | 81 | | 58.4 | | 30 | | 32 | | 2.8 | | 2 | | 1 | |
| C.V. | 9 | | 1.3 | | 4 | | 4 | | 54.3 | | 63 | | 68 | |
| L.S.D. (0.05) | 4 | | 0.4 | | 1 | | 1 | | 1.0 | | 1 | | 1 | |

* Varieties are ordered by descending yield averages. The number in parentheses below column headings indicates the number of location-years on which data are based. A plus or minus sign indicates a performance significantly above or below the test average.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

♠ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

**Table 2. Summary of performance of VA97W-24 and VA98W-706 in the Virginia Tech Wheat Test, 2002 harvest.***

| Line | Yield (Bu/a) (5) | | Test Weight (Lb/bu) (5) | | Date Headed (Mar31+) (4) | | Height (In) (3) | | Lodging (0.2-10) (3) | | Powdery Mildew (0-9) (3) | | Leaf Rust (0-9) (2) | Barley Yellow Dwarf Virus (0-9) (2) | Stripe Rust (0-9) (1) | Early Height (inches) (1) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VA97W-24** | 93 | + | 58.1 | - | 28 | + | 36 | + | 0.3 | | 1 | - | 2 | 3 | 0 | 6.7 | |
| **VA98W-706** | 85 | + | 59.4 | + | 26 | | 32 | - | 0.3 | | 1 | - | 0 | 3 | 0 | 5.5 | - |
| TRIBUTE | 91 | + | 60.7 | + | 26 | | 32 | - | 0.7 | | 0 | - | 0 | 1 | 0 | 5.0 | - |
| SISSON | 90 | + | 58.6 | | 25 | - | 32 | - | 1.5 | | 1 | - | 4 | 2 | 2 | 7.3 | |
| SS 550(R) | 90 | + | 58.3 | | 26 | | 34 | | 1.3 | | 1 | - | 3 | 1 | 2 | 7.0 | |
| McCORMICK | 89 | + | 60.0 | + | 26 | | 32 | - | 0.5 | | 1 | - | 0 | 2 | 0 | 5.5 | - |
| USG 3209(RT) | 87 | + | 57.9 | - | 24 | - | 31 | - | 2.0 | + | 1 | - | 5 | 2 | 0 | 8.0 | |
| SS 520(R) | 87 | + | 58.2 | - | 24 | - | 36 | + | 0.9 | | 1 | - | 4 | 3 | 2 | 8.7 | + |
| PIONEER 26R24(B) | 86 | + | 58.8 | | 25 | - | 35 | + | 0.9 | | 2 | | 3 | 2 | 1 | 6.3 | |
| AGS2000(TV) | 79 | | 58.7 | | 24 | - | 33 | - | 2.9 | + | 2 | | 1 | 3 | 0 | 9.0 | + |
| CENTURY II(D) | 78 | | 58.8 | | 26 | | 34 | | 1.5 | | 4 | + | 2 | 3 | 0 | 7.7 | |
| PIONEER 26R38(B) | 77 | - | 57.9 | - | 26 | | 36 | + | 1.8 | + | 2 | | 2 | 2 | 0 | 10.3 | + |
| SS 518(R) | 75 | - | 58.0 | - | 24 | - | 32 | - | 5.1 | + | 1 | - | 0 | 3 | 0 | 9.8 | + |
| PIONEER 26R61(B) | 74 | - | 59.9 | + | 25 | - | 35 | + | 1.4 | | 3 | + | 1 | 3 | 0 | 9.8 | + |
| Average (n=65) | 81 | | 58.6 | | 26 | | 34 | | 0.9 | | 2 | | 2 | 2 | 0 | 7.2 | |
| C.V. | 7 | | 1.1 | | 4 | | 3 | | 89.5 | | 34 | | 43 | 38 | --- | 11.4 | |
| LSD (0.05) | 4 | | 0.4 | | 1 | | 1 | | 0.7 | | 1 | | | | --- | 1.3 | |

* Varieties are ordered by descending statewide yield averages. These averages do not include yield or test weight data from Blackstone. A plus or minus sign indicates a performance significantly above or below the test average.

The number in parentheses below column headings indicates the number of locations on which data are based.

Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

**Wheat line having white seed color.

Early height (March 8) is an indication of the daylength sensitivity of a variety. Taller varieties began jointing in early March and thus were taller.

**Table 3. Summary of performance of VA97W-24, VA98W-706, and VA98W-750 in the Virginia Tech Wheat Test, 2001 harvest.***

| Line | Yield (Bu/acre) (7) | Test Weight (Lb/bu) (7) | Date Headed (Mar 31+) (4) | Height (In) (3) | Lodging♥ (0.2-10) (5) | Powdery Mildew (0-9) (4) | Leaf Rust (0-9) (1) |
|---|---|---|---|---|---|---|---|
| **VA97W-24(RT)** | 81 + | 58.2 | 35 + | 33 + | 3.9 | 1 - | 1 |
| **VA98W-706(RT)** | 81 + | 58.5 + | 33 | 29 - | 2.0 - | 2 - | 0 - |
| **VA98W-750(RT)** | 79 | 57.1 | 34 + | 29 - | 3.2 | 1 - | 0 - |
| TRIBUTE(RT) | 87 + | 60.3 + | 33 | 30 | 2.8 | 0 - | 0 - |
| USG 3209(RT) | 84 + | 57.6 | 33 | 28 - | 3.3 | 2 - | 1 |
| PIONEER 26R24(B) | 84 + | 57.8 | 33 | 34 + | 3.4 | 3 | 2 + |
| SS550 | 83 + | 57.5 | 33 | 29 - | 3.7 | 2 - | 1 |
| SISSON (RT) | 83 + | 57.5 | 31 - | 30 | 4.3 + | 2 - | 1 |
| SS520 | 83 + | 56.9 | 32 - | 33 + | 4.0 | 3 | 3 + |
| McCORMICK(RT) | 83 + | 60.0 + | 34 + | 29 - | 2.6 | 0 - | 0 - |
| CENTURY II(D) | 83 + | 58.2 | 33 | 31 | 4.0 | 4 + | 0 - |
| FFR 518(RT) | 78 | 56.6 | 32 - | 30 | 5.3 + | 1 - | 0 - |
| PIONEER 26R38(B) | 76 | 57.2 | 33 | 34 + | 3.9 | 1 - | 1 |
| AGS2000 | 75 | 57.9 | 32 - | 31 | 4.6 + | 2 - | 0 - |
| PIONEER 26R61(B) | 72 - | 59.1 + | 34 + | 33 + | 2.0 - | 3 | 0 - |
| Test Average (n=71) | 77 | 57.3 | 33 | 31 | 3.1 | 3 | 1 |
| C.V. | 8 | 3.5 | 3 | 5 | 5.7 | 43 | 47 |
| L.S.D. (0.05) | 4 | 1.2 | 1 | 2 | 1.1 | 1 | 1 |

* Varieties are ordered by descending statewide yield averages. A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of locations on which data are based.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

♠ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

**Table 4. Two-year summary of performance of VA97W-24 and VA98W-706 in the Virginia Tech No-Till Wheat Test at Warsaw, 2001 and 2002 harvests.***

| Line | Yield (Bu/acre) (2) | | Test Weight (Lb/bu) (2) | | Date Headed (Mar 31+) (2) | | Height (In) (2) | | Lodging© (0.2-10) (1) | | Powdery Mildew (0-9) (2) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VA97W-24** | 102 | + | 56.1 | | 30 | + | 32 | + | 2.0 | | 1 | |
| **VA98W-706** | 90 | | 57.0 | | 29 | | 26 | - | 0.2 | | 0 | - |
| TRIBUTE | 99 | + | 59.4 | + | 29 | | 28 | | 0.4 | | 0 | - |
| SS550 | 95 | | 56.2 | | 29 | | 27 | - | 1.5 | | 1 | |
| SISSON | 95 | | 55.9 | | 27 | - | 26 | - | 0.6 | | 1 | |
| SS520 | 94 | | 55.6 | - | 27 | - | 30 | + | 0.3 | | 0 | - |
| McCORMICK | 93 | | 58.4 | + | 30 | + | 27 | - | 3.4 | | 0 | - |
| PIONEER 26R24 | 90 | | 56.1 | | 30 | + | 28 | | 1.9 | | 1 | |
| USG 3209 | 88 | | 55.7 | - | 29 | | 26 | - | 1.2 | | 1 | |
| CENTURY II | 84 | | 56.5 | | 30 | + | 28 | | 1.1 | | 2 | + |
| FFR 518 | 83 | | 55.4 | - | 30 | + | 27 | - | 4.4 | + | 0 | - |
| PIONEER 26R38 | 80 | - | 55.1 | - | 31 | + | 29 | + | 1.1 | | 1 | |
| AGS2000 | 79 | - | 56.6 | | 28 | - | 28 | | 3.2 | | 1 | |
| PIONEER 26R61 | 75 | - | 57.6 | + | 30 | + | 30 | + | 0.2 | | 2 | + |
| Test Average (n=14) | 89 | | 56.5 | | 29 | | 28 | | 1.5 | | 1 | |
| C.V. | 8 | | 1.4 | | 3 | | 4 | | 103.8 | | 75 | |
| L.S.D. (0.05) | 7 | | 0.8 | | 1 | | 1 | | 2.3 | | 1 | |

* Varieties are ordered by descending yield averages. The number in parentheses under column headings indicates the number of years upon which data are based. A plus or minus sign indicates a performance significantly above or below the test average.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

♠ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

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**Table 5. Summary of performance of VA97W-24 and VA98W-706 in the Virginia Tech No-Till Wheat Test at Warsaw, 2002 harvest.***

| Line | Yield (Bu/acre) | | Test Weight (Lb/bu) | | Lodging (0.2-10) | | Date Headed (Mar31+) | | Height (In) | | Powdery Mildew one rep (0-9) | Leaf Rust (0-9) | | Freeze Damage one rep (1-5) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VA97W-24** | 106 | + | 54.2 | | 2.0 | | 22 | + | 31 | + | 2 | 5 | | 2 |
| **VA98W-706** | 91 | | 54.2 | | 0.2 | | 20 | - | 28 | - | 0 | 5 | | 2 |
| TRIBUTE | 101 | + | 57.3 | + | 0.4 | | 20 | - | 29 | - | 0 | 2 | - | 1 |
| McCORMICK | 98 | + | 56.1 | + | 3.4 | + | 22 | + | 30 | | 1 | 3 | - | 1 |
| SS 550(R) | 96 | + | 53.2 | | 1.5 | | 20 | - | 30 | | 1 | 7 | + | 3 |
| SS 520(R) | 91 | + | 52.8 | | 0.3 | | 20 | - | 31 | + | 2 | 6 | | 2 |
| SISSON | 90 | + | 52.3 | - | 0.6 | | 18 | - | 28 | - | 3 | 7 | + | 2 |
| PIONEER 26R24(B) | 89 | + | 53.2 | | 1.9 | | 20 | - | 30 | | 3 | 8 | + | 2 |
| CENTURY II(D) | 81 | | 53.6 | | 1.1 | | 20 | - | 30 | | 3 | 4 | | 4 |
| USG 3209(RT) | 80 | | 52.7 | | 1.2 | | 20 | - | 27 | - | 4 | 5 | | 4 |
| SS 518(R) | 76 | | 52.3 | - | 4.4 | + | 20 | - | 28 | - | 0 | 3 | - | 4 |
| AGS2000(TV) | 73 | - | 54.0 | | 3.2 | + | 17 | - | 29 | - | 3 | 4 | | 4 |
| PIONEER 26R38(B) | 70 | - | 51.3 | - | 1.1 | | 21 | | 32 | + | 1 | 5 | | 4 |
| PIONEER 26R61(B) | 65 | - | 55.6 | + | 0.2 | | 21 | | 31 | + | 2 | 3 | - | 4 |
| Location Average (n=65) | 82 | | 53.6 | | 1.1 | | 21 | | 30 | | 3 | 5 | | 24 |
| LSD (0.10) | 7 | | 1.1 | | 1.4 | | 1 | | 1 | | --- | 2 | | --- |
| C.V. | 8 | | 1.8 | | 112.0 | | 5 | | 4 | | --- | 35 | | --- |

* Varieties are ordered by descending yield averages. A plus or minus sign indicates a performance significantly above or below the test average. There is only one rep of data for powdery mildew and freeze damage.

Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is wheat unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is wheat standing upright and 5 is wheat totally flat.

The 0-9 ratings indicate degree to which plant is affected, where 0=none and 9=total plant affected.

The freeze damage ratings 1-5 are 1=no damage and 5=all early tillers killed.

**Table 6. Summary of performance of VA97W-24, VA98W-706, and VA98W-750 in the Virginia Tech No-till Wheat Test at Warsaw, 2001 harvest.***

| Line | Yield (Bu/acre) | | Test Weight (Lb/bu) | Date Headed (Mar 31+) | | Height (In) | | Powdery Mildew (0-9) | |
|---|---|---|---|---|---|---|---|---|---|
| **VA97W-24(RT)** | 99 | + | 57.9 | 38 | + | 33 | + | 0 | - |
| **VA98W-706(RT)** | 89 | | 59.7 | 35 | - | 25 | - | 0 | - |
| **VA98W-750(RT)** | 89 | | 58.8 | 38 | + | 24 | - | 0 | - |
| SISSON (RT) | 100 | + | 59.8 | 33 | - | 25 | - | 1 | |
| USG 3209(RT) | 97 | + | 58.2 | 36 | | 25 | - | 0 | - |
| SS520 | 97 | + | 58.4 | 33 | - | 29 | + | 0 | - |
| TRIBUTE | 97 | + | 61.1 | 35 | - | 27 | | 0 | - |
| SS550 | 94 | | 59.3 | 35 | - | 24 | - | 0 | - |
| PIONEER 26R38(B) | 90 | | 59.3 | 37 | + | 28 | + | 0 | - |
| FFR 518(RT) | 90 | | 58.3 | 37 | + | 26 | - | 0 | - |
| PIONEER 26R24(B) | 90 | | 58.7 | 37 | + | 27 | | 2 | + |
| CENTURY II(D) | 88 | | 59.3 | 37 | + | 27 | | 2 | + |
| McCORMICK | 88 | | 60.6 | 37 | + | 25 | - | 0 | - |
| PIONEER 26R61(B) | 85 | | 59.5 | 38 | + | 31 | + | 3 | + |
| AGS2000 | 85 | | 58.4 | 39 | + | 26 | - | 0 | - |
| Test Average (n=71) | 88 | | 58.3 | 36 | | 27 | | 1 | |
| L.S.D. (0.05) | 9 | | 5.9 | 1 | | 1 | | 1 | |
| C.V. | 7 | | 7.3 | 3 | | 4 | | 68 | |

* Varieties are ordered by descending yield averages. A plus or minus sign indicates a performance significantly above or below the test average.

◆ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 8. Mean performance of VA98W-706 in the 2001-02 Uniform Eastern Soft Red Winter Wheat Nursery: Agronomic and disease resistance characteristics.

| | Blacksburg VA | | Mean Yield All Locs | | Mean Test Wt. All Locs | | Mean Head Date All Locs | | Mean Plant Ht. All Locs | | Mean Lodging 16 Locs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | bu/ac | rank | bu/ac | rank | lbs/bu | rank | Julian | rank | Inches | rank | 0-9 |
| VA98W-706 | 72.2 | 27 | 72.0 | 7 | 58.8 | 5 | 130.4 | 4 | 33.3 | 42 | 2.3 |
| Caldwell | 64.3 | 39 | 58.5 | 43 | 56.6 | 32 | 135.0 | 34 | 37.7 | 14 | 2.3 |
| Foster | 78.6 | 6 | 66.6 | 30 | 57.3 | 24 | 134.7 | 32 | 36.9 | 24 | 2.0 |
| Patton | 75.4 | 18 | 70.6 | 10 | 57.6 | 19 | 131.4 | 8 | 37.9 | 10 | 2.2 |
| Roane | 82.6 | 2 | 69.4 | 14 | 59.8 | 2 | 135.1 | 35 | 34.8 | 33 | 3.0 |
| Tribute (VA98W-593) | 80.6 | 3 | 72.9 | 4 | 59.9 | 1 | 131.9 | 13 | 33.6 | 38 | 3.0 |

| | Winter Kill/Freeze Damage | | | | | | Powdery Mildew | Leaf Rust | | | Stem Rust |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | Bay AR freeze (1-9) | Manhattan KS winter dmg. | Columbia MO survival (%) | Columbia MO freeze injury (%) | Smithville OH survival (%) | Nairn ONTARIO survival (%) | 6 Locs 0-9 | 7 Locs (0-9) | Baton Rouge LA | St. Paul MN | St. Paul MN |
| VA98W-706 | 1.3 | 3.0 | 91.0 | 1.3 | 100.0 | 88.0 | 1.2 | 1.4 | 0 | 20MR-MS | 60MS-S |
| Caldwell | 1.3 | 4.0 | 87.0 | 2.0 | 98.0 | 88.7 | 4.1 | 1.8 | 50 MS | 10MR-MS | 60MS-S |
| Foster | 1.0 | 3.0 | 93.0 | 1.7 | 98.5 | 93.3 | 3.3 | 2.0 | 15 MS | 40MR-MS | TR |
| Patton | 1.7 | 2.0 | 93.0 | 1.3 | 100.0 | 95.3 | 3.8 | 0.8 | 0 | 40MR-MS | TR-MR |
| Roane | 2.0 | 4.0 | 89.0 | 2.7 | 95.0 | 97.3 | 1.7 | 1.5 | 7 MR | 60S | 40MS-S |
| Tribute (VA98W-593) | 1.0 | 3.0 | 91.0 | 1.0 | 100.0 | 94.0 | 0.4 | 1.5 | 0 | 20MR-MS | 20R-MR |

| | Stripe Rust | Septoria | | Fusarium Head Blight (Scab) | | | BYDV | Spindle Streak | Soil Borne Mosaic |
|---|---|---|---|---|---|---|---|---|---|
| Line | 2 Locs % | *Septoria tritici* 5 Locs 0-9 | *Stagonospora nodorum* Lexington, KY 0-5 | Urbana IL Incid. (%) | Urbana IL Sev. (%) | Urbana IL Index (0-100) | 2 Locs 0-5 | 5 Locs 0-9 | Clay Co. AR | Urbana IL 0-9 |
| VA98W-706 | 5.0 | 3.5 | 3 | 95.0 | 60.0 | 57.0 | 3.8 | 3.7 | 1.0 | 2.5 |
| Caldwell | 51.7 | 5.3 | 4 | 86.7 | 39.5 | 34.2 | 2.8 | 3.9 | 3.7 | 6.0 |
| Foster | 70.0 | 3.7 | 2 | 80.0 | 23.3 | 18.9 | 2.3 | 2.0 | 4.3 | 1.5 |
| Patton | 75.0 | 4.6 | 2 | 76.7 | 28.6 | 22.3 | 2.0 | 3.1 | 0 | 1.0 |
| Roane | 28.7 | 3.5 | 3 | 75.0 | 27.4 | 20.6 | 1.5 | 2.2 | 3.7 | 5.0 |
| Tribute (VA98W-593) | 27.4 | 2.5 | 3 | 85.0 | 33.3 | 27.9 | 1.6 | 3.3 | 3.7 | 7.5 |

Table 11. Summary of performance of VA98W-706 in the 1999-2000 Advance Wheat Yield Test in Virginia over 4 locations. The numbers below each column heading indicate the number of locations upon which data are based.

| Line | Yield (bu/a) | Percent of Test Mean (Yield) | Test Weight (lbs/bu) | Heading Date (March 31+) | Plant Height (in) | Lodging (0.2-10)[1] | Powdery Mildew (0-9)[2] | Leaf Rust (0-9) | BYDV (0-9) | Plant Height on 3/24/00 (in)[3] | Juvenile Plant Growth Habit (0-5)[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 1 |
| VA98W-706 | 89.9 | 107.0 | 58.2 | 30 | 34 | 1.0 | 1 | 2 | 3 | 11 | 1 |
| ROANE | 82.3 | 98.0 | 58.7 | 33 | 34 | 1.3 | 3 | 4 | 2 | 11 | 0 |
| COKER 9663 | 81.1 | 96.5 | 58.0 | 30 | 40 | 2.1 | 4 | 1 | 2 | 15 | 2 |
| FFR 555W | 70.4 | 83.8 | 55.5 | 34 | 35 | 0.2 | 6 | 7 | 3 | 12 | 1 |
| PION 2580 | 86.6 | 103.1 | 56.2 | 29 | 38 | 0.5 | 3 | 5 | 2 | 12 | 2 |
| PION26R24 | 89.5 | 106.5 | 57.2 | 30 | 38 | 1.1 | 3 | 4 | 2 | 13 | 1 |
| AGS 2000 | 88.1 | 104.9 | 57.5 | 28 | 36 | 1.4 | 2 | 1 | 2 | 14 | 3 |
| VA98W-750 | 91.0 | 108.3 | 57.0 | 33 | 35 | 0.3 | 1 | 2 | 2 | 13 | 2 |
| **GRAND MEAN** | 84.3 | | 56.9 | 31 | 36 | 1.0 | 2 | 3 | 2 | 13 | 1 |
| **CV** | 12.3 | | 2.2 | 13 | 3 | 106.1 | 83 | 49 | 84 | 7 | 24 |
| **LSD** | 7.3 | | 0.9 | 3 | 1 | 0.9 | 2 | 1 | 2 | 1 | 0 |

[1] Belgian lodging scale = area x intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

[2] All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total plant infection.

[3] This height measurement serves as an estimate of spring growth habit.

[4] Juvenile Plant Growth Habit: 0 = prostrate; 5 = very erect.

Table 12. Summary of performance of VA98W-706 in the 1998-99 Preliminary Wheat Test at Blacksburg, Warsaw, and Painter, Virginia and Plymouth, North Carolina. The number below each column heading indicates the number of locations upon which data are based.

| Line | Yield (bu/a) | Test Weight (lbs/bu) | Heading Date (Julian) | Height (in.) | Lodging (0.2-10)[1] | Winter Kill (0-9)[2] | Powdery Mildew (0-9) | Leaf Rust (0-9) | Septoria (0-9) | BYDV (0-9) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4 | 4 | 2 | 2 | 3 | 1 | 2 | 3 | 1 | 2 |
| VA98W-706 | 85.5 | 60.1 | 124 | 33 | 0.3 | 2 | 0 | 1 | 1 | 2 |
| Madison | 77.7 | 57.4 | 122 | 37 | 0.8 | 2 | 2 | 4 | 3 | 1 |
| Agripro Patton | 75.6 | 58.2 | 124 | 36 | 0.5 | 0 | 2 | 1 | 1 | 3 |
| Roane | 85.8 | 60.8 | 128 | 34 | 1.3 | 0 | 1 | 4 | 2 | 1 |
| Pocahontas | 77.8 | 59.3 | 122 | 35 | 0.9 | 2 | 2 | 5 | 1 | 3 |
| Coker 9663 | 75.6 | 59.3 | 123 | 38 | 0.8 | 3 | 4 | 1 | 1 | 1 |
| Pioneer 2580 | 90.1 | 58.4 | 123 | 36 | 0.7 | 3 | 2 | 4 | 2 | 2 |
| FFR 555W | 71.6 | 58.3 | 128 | 35 | 0.4 | 4 | 6 | 4 | 1 | 2 |
| VA98W-750 | 83.5 | 59.0 | 126 | 34 | 0.2 | 0 | 1 | 3 | 1 | 2 |
| VA98W-817 | 77.4 | 57.9 | 122 | 37 | 0.4 | 1 | 1 | 1 | 2 | 4 |
| *Test Mean (n=93)* | 80.4 | 58.8 | 125 | 34 | 0.6 | 2 | 1 | 2 | 0.5 | 2 |
| *LSD (0.05)* | 5.8 | 0.5 | 1 | 1 | 0.6 | 1 | 1 | 1 | 0.5 | 1 |

[1] Belgian Lodging Scale=area x intensity x 0.2. Area is rated on a scale from 1 (plot unaffected) to 10 (entire plot affected). Intensity is rated on a scale from 1 (plants standing upright) to 5 (plants lying totally flat on the ground).

[2] All 0-9 ratings indicated relative disease severity: 0 = no disease present; 9 = total plant infection.

Table 13. Milling and baking quality of VA98W-706 in the 2001-02 Uniform Eastern Soft Red Winter Wheat Nursery.

| | Mill Score | Bake Score | Soft Equiv. % | Flour Yield % | Flour Protein % | Gluten Strength (lactic acid ret'n) | Water Absorb % | Cookie Diam. cm |
|---|---|---|---|---|---|---|---|---|
| VA98W-706 | 92.7 C | 86.5 D | 48.5** | 71.5 | 9.82 | 118.9 | 57.8 | 17.91* |
| Caldwell (standard) | 100.0 A | 100.0 A | 59.1 | 71.8 | 8.65 | 111.5 | 60.3 | 18.2 |
| Foster | 101.6 A | 94.9 B | 53.2* | 74.0 | 9.44 | 99.5 | 57.1 | 18.1 |
| Patton | 90.8 C | 82.8 E | 53.3* | 70.4* | 9.63 | 94.6 | 61.9 | 17.82* |
| Roane | 86.6 D | 54.3 F | 54.7* | 68.9** | 9.58 | 117.1 | 65.4** | 16.78** |
| McCormick | 91.0 C | 73.9 F | 54.8* | 70.0** | 9.73 | 114.5 | 63.2* | 17.47** |

*One standard deviation below the check variety
**Two standard deviations below the check variety

Table 14. Milling and baking quality of VA98W-706 versus Foster in the 2000-01 Mason-Dixon Soft Red Winter Wheat Nursery.

| | Mill Score | Bake Score | Flour Yield % | Soft Equiv. % | Flour Protein % | Gluten Strength (lactic acid ret'n) | Water Absorb % |
|---|---|---|---|---|---|---|---|
| VA98W-750 | 82.5 E | 96.9 B | 70.8** | 57.98 | 7.77 | 82.75 | 57.4** |
| **VA98W-706** | **92.9 C** | **93.1 C** | **74.0**** | **48.08*** | **9.13** | **79.11** | **53.3** |
| VA97W-24 | 91.8 C | 94.8 C | 73.7** | 52.78 | 8.05 | 73.29 | 55.7* |
| Foster (standard) | 100.0 A | 100.0 A | 76.3 | 52.73 | 8.34 | 74.13 | 52.7 |
| Roane | 85.4 D | 89.1 D | 71.7** | 53.60 | 8.06 | 85.39 | 59.7** |
| Coker 9663 | 87.9 D | 83.3 E | 72.5** | 47.08* | 8.75 | 79.62 | 58.2** |
| Pion 2580 | 88.2 D | 84.8 E | 72.6** | 47.90* | 8.55 | 79.92 | 58.0** |

*One standard deviation below the check variety
**Two standard deviations below the check variety

Table 15. Milling and baking quality of VA98W-706 in the 2000-01 Virginia State Wheat Nursery.

| | Mill Score | Bake Score | Flour Yield % | Soft Equiv. % | Flour Protein % | Gluten Strength (lactic acid ret'n) | Water Absorb % | Cookie Diam. cm |
|---|---|---|---|---|---|---|---|---|
| VA98W-706 | 102.4 A | 103.5 A | 74.2 | 52.6 | 8.26 | 116.0 | 55.5 | 18.28 |
| VA97W-24 | 102.4 A | 104.0 A | 73.7 | 53.1* | 7.78 | 86.0 | 57.2 | 18.20 |
| Pioneer 26R24 | 100.0 A | 100.0 A | 72.3 | 56.7 | 7.79 | 114.3 | 58.9 | 17.79 |
| Massey | 100.1 A | 105.2 A | 72.7 | 54.3 | 8.18 | 116.5 | 56.9 | 18.17 |
| Jackson | 100.8 A | 107.5 A | 72.1 | 59.6 | 7.95 | 122.6 | 58.9 | 18.25 |
| Roane | 95.1 B | 102.6 A | 70.7** | 58.2 | 7.33 | 110.8 | 60.5 | 18.31 |
| Sisson | 96.1 B | 80.7 E | 72.3 | 50.9 | 7.56 | 91.8 | 60.6* | 17.34 |
| USG 3209 | 86.5 D | 85.3 D | 70.2** | 48.2** | 7.38 | 111.1 | 63 3 | 18.00 |
| Century II | 105.6 A | 100.5 A | 73.7 | 57.1 | 7.88 | 102.6 | 59.6 | 17.87 |
| AGS 2000 | 104.1 A | 105.8 A | 74.7 | 55.0 | 7.64 | 105.0 | 56.9 | 18.85 |
| Coker 9663 | 91.9 C | 96.0 B | 71.2* | 51.4* | 7.37 | 111.4 | 57.6 | 17.73 |
| Coker 9835 | 104.6 A | 105.5 A | 73.1 | 59.4 | 7.29 | 95.7 | 59.7 | 18.49 |
| Pioneer 2580 | 91.9 C | 103.2 A | 70.9* | 53.7 | 7.29 | 109.7 | 57.2 | 17.96 |
| Pioneer 2684 | 97.0 B | 104.3 A | 72 | 53.5* | 8.32 | 104.1 | 55.7 | 18.40 |
| Pioneer 2643 | 99.3 B | 106.6 A | 72.3 | 55.8 | 7.72 | 126.4 | 56.7 | 18.53 |
| Pioneer 26R46 | 102.7 A | 104.4 A | 75.5 | 53.5* | 7.29 | 113.4 | 54.2 | 18.96 |
| FFR555W | 102.5 A | 105.7 A | 73.4 | 54.8 | 7.70 | 104.1 | 55.1 | 18.72 |

*One standard deviation below the check variety
**Two standard deviations below the check variety

Table 16. Milling and baking quality of VA98W-706 in the 2000-01 Virginia Elite Wheat Nursery.

| | Mill Score | Bake Score | Flour Yield | Soft Equiv. | Flour Protein | Gluten Strength | Water Absorb | Cookie Diam. |
|---|---|---|---|---|---|---|---|---|
| | | | % | % | % | (lactic acid ret'n) | % | cm |
| VA98W-750 | 85.9 D | 93.8 C | 69.3** | 52.1 | 10.77* | 83.4 | 51.6 | 17.18 |
| **VA98W-706** | **95.6 B** | **101.5 A** | **72.4*** | **49.0** | **9.92** | **114.2** | **48.2** | **17.44** |
| FFR555W (standard) | 100.0 A | 100.0 A | 73.3 | 50.9 | 9.54 | 103.2 | 47.8 | 16.99 |
| Coker 9663 | 89.5 D | 88.8 D | 71.2** | 47.3* | 9.01 | 112.3 | 49.6* | 16.92 |
| Patton | 93.1 C | 87.6 D | 71.2** | 52.2 | 10.04 | 89.0 | 51.3** | 16.86 |
| Roane | 91.3 C | 83.8 E | 70.0** | 55.0 | 9.10 | 105.2 | 50.2* | 16.48** |
| USG 3209 | 85.3 D | 59.5 F | 69.7** | 48.8 | 10.19 | 108.6 | 54.7** | 16.22** |

*One standard deviation below the check variety
**Two standard deviations below the check variety

Table 17. Milling and baking quality of VA98W-706 in the 1999-2000 Virginia Advance Wheat Nursery.

| | Mill Score | Bake Score | Flour Yield % | Soft Equiv. % | Flour Protein % | Gluten Strength (lactic acid ret'n) | Water Absorb % |
|---|---|---|---|---|---|---|---|
| VA98W-750 | 89.6 D | 92.4 C | 72.6** | 53.97 | 9.3 | 75.9 | 59.3* |
| **VA98W-706** | **96.5 B** | **90.1 C** | **74.8*** | **49.43*** | **9.27** | **86.6** | **57.3** |
| FFR555W (standard) | 100.0 A | 100.0 A | 75.9 | 54.26 | 8.65 | 77.9 | 54.9 |
| Roane | 88.4 D | 93.8 C | 72.3** | 55.52 | 8.37 | 78.8 | 59.6* |
| Coker 9663 | 92.5 C | 87.8 D | 73.5** | 50.28* | 8.06 | 71.0 | 59.3* |
| Pion 2580 | 87.5 D | 96.4 B | 71.9** | 55.64 | 7.23 | 72.8 | 58.1* |
| Pion 26R24 | 92.9 C | 99.0 B | 73.7** | 58.05 | 8.02 | 84.8 | 58.3* |

*One standard deviation below the check variety

Table 18. Milling and baking quality of VA98W-706 in the 1998-99 Virginia Preliminary Wheat Nursery.

| | Mill Score | Bake Score | Flour Yield | Soft Equiv. | Flour Protein | Gluten Strength | Water Absorb | Cookie Diam. |
|---|---|---|---|---|---|---|---|---|
| | | | % | % | % | (lactic acid ret'n) | % | cm |
| VA98W-750 | 93.4 C | 84.4 E | 70.0** | 57.0 | 8.04 | 106.0 | 59.2** | 18.13 |
| **VA98W-706** | **99.9 A** | **79.7 F** | **72.8** | **51.2** | **8.18** | **113.4** | **56.6*** | **17.78**** |
| VA98W-817 | 79.9 F | 61.7 F | 67.9** | 49.2* | 8.38 | 139.3 | 60.2** | 17.47** |
| Madison (standard) | 100.0 A | 100.0 A | 72.6 | 53.1 | 8.29 | 107.3 | 54.2 | 18.36 |
| Patton | 99.0 B | 90.2 C | 72 | 54.4 | 7.67 | 95.9 | 57.9** | 18.30 |
| Roane | 91.1 C | 61.4 F | 69.7** | 54.4 | 7.52 | 105.7 | 52.4** | 17.48** |
| Coker 9663 | 89.3 D | 50.5 F | 70.4** | 49.1* | 8.07 | 108.2 | 60.6** | 16.98** |
| Pioneer 2580 | 87.1 D | 58.4 F | 69.1** | 53.6 | 7.23 | 101.8 | 60.6** | 17.14** |
| FFR555W | 105.9 A | 91.6 C | 73.8 | 54.7 | 7.58 | 98.8 | 56.8* | 18.21 |

*One standard deviation below the check variety
**Two standard deviations below the check variety

Table 19. Milling and baking quality of VA98W-706 in the 1997-98 Virginia Wheat Observation Nursery.

| | Mill Score | Bake Score | Flour Yield | Soft Equiv. | Flour Protein | Water Absorb |
|---|---|---|---|---|---|---|
| | | | % | % | % | % |
| VA98W-750 | 92.8 C | 93.7 C | 72.2** | 54.24 | 10.70 | 56.7** |
| **VA98W-706** | **100.9 A** | **92.6 C** | **74.7** | **49.23*** | **10.46** | **53.7** |
| Madison (standard) | 100.0 A | 100.0 A | 74.4 | 52.84 | 9.86 | 52.1 |
| FFR555W | 100.9 A | 96.8 B | 74.7 | 53.55 | 8.45 | 54.4* |
| Jackson | 95.5 B | 97.3 B | 73.0* | 56.29 | 9.17 | 56.2* |
| Pioneer 2580 | 92.9 C | 96.6 B | 72.2** | 55.23 | 8.35 | 55.8* |
| Pioneer 2552 | 100.9 A | 92.0 C | 74.7 | 51.93 | 9.64 | 56.0* |
| Pioneer 2643 | 95.9 B | 98.3 B | 73.1* | 55.97 | 9.01 | 55.3* |
| Pioneer 2691 | 90.4 C | 101.9 A | 71.5** | 59.77 | 9.43 | 53.9 |
| Coker 9803 | 96.0 B | 99.1 B | 73.2* | 56.12 | 8.94 | 55.0* |
| Coker 9835 | 94.3 C | 96.5 B | 72.7** | 61.98 | 7.86 | 57.0** |

*One standard deviation below the check variety
**Two standard deviations below the check variety

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

# EXHIBIT E
# STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued *(7 U.S.C. 2421)*. The information is held confidential until the certificate is issued *(7 U.S.C. 2426)*.

| 1. NAME OF APPLICANT(S) | 2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER | 3. VARIETY NAME |
|---|---|---|
| Virginia Tech Intellectual Properties, Inc. | VA98W-706 | 3706 |
| **4. ADDRESS** *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)* | **5. TELEPHONE** *(Include area code)* | **6. FAX** *(Include area code)* |
| 1872 Pratt Drive<br>Suite 1625<br>Blacksburg, VA 24060 | 540-951-9374 | 540-951-5292 |
| | **7. PVPO NUMBER** 200500325 | |

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.** [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** [X] YES [ ] NO

10. Is the applicant the original owner? [ ] YES [X] NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?
[ ] YES [ ] NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?
[X] YES [ ] NO **If no, give name of country**

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

**Original owner Virginia Polytechnic Institute and State University assigned its ownership to current owner Virginia Tech Intellectual Properties, Inc. (See Attached document).**

**PLEASE NOTE:**

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

## GROUP GERMPLASM ASSIGNMENT

| | |
|---|---|
| VTIP 03.017 | VA97W-24 |
| VTIP 03.018 | VA98W-586 |
| VTIP 03.019 | VA98W-706 |
| VTIP 03.020 | VA98W-750 |
| VTIP 03.021 | VA98W-817 |
| VTIP 03.022 | DAN/VA97B-388 Barley |
| VTIP 03.023 | DOYCE/VA00H-137 Barley |
| VTIP 03.024 | VT67 and VT120 Soybean |

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY (hereinafter referred to as the "UNIVERSITY"), assigns to VIRGINIA TECH INTELLECTUAL PROPERTIES, INC. (hereinafter referred to as "VTIP") all rights, title and interest in and to all of the above-listed GERMPLASMS as held by the UNIVERSITY.

The UNIVERSITY, by its authorized agents, agrees that it will execute all necessary assignments as requested by VTIP, to facilitate the filing of patent applications and/or copyright registrations. It will render any reasonable assistance requested to aid in preparation of such applications and/or registrations.

The UNIVERSITY shall retain the right to make use of the GERMPLASMS for internal research and other non-commercial purposes without cost to the UNIVERSITY.

All royalties, rents, payments, or any cash receipts from the sale, assignment, transfer, licensing or use of the GERMPLASMS shall be the property of VTIP and shall be distributed according to the provisions of the Virginia Agricultural Experiment Station (VAES) Plant Germplasm Release Policy (PGRP).

Prior to the execution of this Assignment, the UNIVERSITY has not granted the right of license to make, use, or sell said GERMPLASMS to anyone except to VTIP, nor has it otherwise encumbered its rights, title and interest in said GERMPLASMS, and it will not execute any instrument in conflict with this Assignment.

IN WITNESS WHEREOF, the UNIVERSITY has caused this Assignment to be signed this 25 day of March, 2003.

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

BY _____
MINNIS E. RIDENOUR
Chief Operating Officer

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STATE OF VIRGINIA

COUNTY OF MONTGOMERY, to-wit:

The foregoing instrument was acknowledged before me this 25th day of March, 2003, by Minnie E. Ridenour of Virginia Polytechnic Institute and State University, on behalf of said University.

Gerry M. Chenault
Notary Public

My commission expires: 2/28/07